

WHAT IS CLAIMED IS:

1. An apparatus for detecting peaks of wavelength-division-multiplexed light, comprising:
 - a tunable optical filter having a bandwidth for
 - 5 selectively passing light of each wavelength of wavelength-division-multiplexed light; and
 - peak detection means for detecting the peaks of the light output from said tunable optical filter.
2. The apparatus according to claim 1, further
- 10 comprising periodic sweeping means for periodically outputting light of each wavelength from said tunable optical filter.
3. The apparatus according to claim 1, further comprising a light-equalizing filter located with said
- 15 tunable optical filter.
4. The apparatus according to claim 2, wherein one or more other tunable optical filters are cascade-connected to said tunable optical filter, and each of these tunable optical filters are periodically swept
- 20 synchronously.
5. An apparatus for controlling wavelength-division-multiplexed light, comprising:
 - optical level control means for controlling the
 - optical level of wavelength-division-multiplexed light;
 - 25 optical branching means for branching a portion of wavelength-division-multiplexed light output from said optical level control means;
 - a tunable optical filter for selectively outputting

light of each wavelength of the branched wavelength-division-multiplexed light;

peak detection means for detecting the peaks of the light output from said tunable optical filter; and

5 feedback means for inputting a feedback signal to said optical level control means in such a manner that maximum peak value will become a set value.

6. The apparatus according to claim 5, wherein one or more other tunable optical filters are cascade-connected
10 to said tunable optical filter, and each of these tunable optical filters are periodically swept synchronously.

7. The apparatus according to claim 5, further comprising a light-equalizing filter located with said
15 tunable optical filter.

8. An apparatus for controlling wavelength-division-multiplexed light, comprising:

an optical amplifier for amplifying wavelength-division-multiplexed light;

20 a tunable optical filter for selectively outputting light of each wavelength of a portion of the wavelength-division-multiplexed light;

peak detection means for detecting the peaks of the light from said tunable optical filter; and

25 feedback means for controlling a gain of the optical amplifier in accordance with the detected peak value.

9. The apparatus according to claim 8, further

comprising power detection means for detecting total power of wavelength-division-multiplexed light output from said optical amplifier;

wherein, in dependence upon the maximum peak value,
5 said feedback means inputs a feedback signal to the excitation light source of said optical amplifier (1) in such a manner that the maximum peak value will become the set value, or (2) in such a manner that the detected power will become a set power.

10 10. The apparatus according to claim 9, further comprising photoelectric conversion means for photoelectrically converting light output from said tunable optical filter and means for detecting number of multiplexed wavelengths based upon number of peaks of
15 the electric signal output from said photoelectric conversion means;

wherein the set power is changed in conformity with the number of multiplexed wavelengths.

11. The apparatus according to claim 8, further
20 comprising means for detecting optical gain, which is a power ratio of input light to said optical amplifier to output light from said optical amplifier;

wherein, in dependence upon the maximum peak value, said feedback means inputs a feedback signal to the
25 excitation light source of said optical amplifier (1) in such a manner that the maximum peak value will become the set value, or (2) in such a manner that the detected optical gain will become a set gain.

12. The apparatus according to claim 8, wherein one or more other tunable optical filters are cascade-connected to said tunable optical filter, and each of these tunable optical filters are periodically swept
5 synchronously.

13. The apparatus according to claim 8, further comprising a light-equalizing filter located with said tunable optical filter.

14. An apparatus for controlling wavelength-division-
10 multiplexed light, comprising:

an optical-fiber amplifier for amplifying wavelength-division-multiplexed light;

optical level control means for controlling the optical level of wavelength-division-multiplexed light
15 output from said optical-fiber amplifier;

a tunable optical filter for selectively outputting light of each wavelength of a portion of the wavelength-division-multiplexed light;

peak-value detection means for detecting peak
20 values of the light output from said tunable optical filter; and

feedback means for controlling said optical level control means based upon the detected peak value.

15. The apparatus according to claim 14, wherein one or
25 more other tunable optical filters are cascade-connected to said tunable optical filter, and each of these tunable optical filters are periodically swept synchronously.

16. The apparatus according to claim 14, further comprising a light-equalizing filter located with said tunable optical filter.

17. An apparatus for controlling wavelength-division-
5 multiplexed light, comprising:

a first optical-fiber amplifier for amplifying wavelength-division-multiplexed light;

optical level control means for controlling the optical level of wavelength-division-multiplexed light
10 output from said first optical-fiber amplifier;

a second optical fiber amplifier for amplifying wavelength-division-multiplexed light output from the optical level control means;

a tunable optical filter for selectively outputting
15 light of each wavelength of a portion of wavelength-division-multiplexed light;

peak detection means for detecting the peaks of the light output from said tunable optical filter; and

feedback means for controlling said optical level
20 control means based upon the detected peak value.

18. The apparatus according to claim 17, further comprising power detection means for detecting power of wavelength-division-multiplexed light output from said second optical-fiber amplifier;

25 wherein, in dependence upon the maximum peak value, said optical level control means controls (1) in such a manner that the maximum peak value will become a set value, or (2) in such a manner that the detected power

will become a set power.

19. The apparatus according to claim 18, further comprising photoelectric conversion means for photoelectrically converting light output from said
5 tunable optical filter and means for detecting number of multiplexed wavelengths based upon number of peaks of the electric signal output from said photoelectric conversion means;

wherein the set power is changed in conformity with
10 the number of multiplexed wavelengths.

20. The apparatus according to claim 17, wherein one or more other tunable optical filters are cascade-connected to said tunable optical filter, and each of these tunable optical filters are periodically swept
15 synchronously.

21. The apparatus according to claim 17, further comprising a light-equalizing filter located with said tunable optical filter.